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10/678,989	10/02/2003	Gi Youl Kim	PA2625US	1554

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EXAMINER

ZERVIGON, RUDY

ART UNIT PAPER NUMBER

1763

DATE MAILED: 07/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/678,989

Applicant(s)

KIM ET AL.

Examiner

Rudy Zervigon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 17-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>9/15/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-16, and 21, drawn to a chemical vapor deposition system, classified in class 118, subclass 715.
 - II. Claims 17-20, drawn to a method of cleaning a CVD system, classified in class 216, subclass 57.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case .
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
4. During a telephone conversation with Tarek N. Fahmi on April 22, 2005 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-16, and 21. Affirmation of this election must be made by applicant in replying to this Office action. Claims 17-20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.
5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the

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currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-16, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over van Os; Ron et al. (US 5,792,272 A) in view of Murugesu; Laxman et al. (US 6,450,117 B1). van Os teaches a deposition system (column 2; lines 10-15) comprising: a cleaning gas (column 4, lines 18-31) configured to generate a reactive cleaning gas (column 4, lines 18-31); and a deposition chamber (16; Figure 1; column 3, lines 30-56) including a processing gas shower (15; Figure 1; column 3, lines 30-56), a cleaning gas (column 4, lines 18-31) distribution channel (54, 56; Figure 4; column 7, lines 18-31) separate from the processing gas shower (15; Figure 1; column 3, lines 30-56), and a plurality of cleaning gas injection ports (44a,b; Figure 4; column 7, lines 18-31) fluidly connected to the cleaning gas (column 4, lines 18-31) distribution channel (54, 56; Figure 4; column 7, lines 18-31) and disposed to introduce the cleaning gas (column 4, lines 18-31) into an interior of the deposition chamber (16; Figure 1; column 3, lines 30-56) – claim 1
van Os further teaches:

- i. The deposition system (column 2; lines 10-15) of claim 1, wherein the cleaning gas (column 4, lines 18-31) distribution channel (54, 56; Figure 4; column 7, lines 18-31) and

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- plurality of cleaning gas injection ports (44a,b; Figure 4; column 7, lines 18-31) are disposed within a lid (piece between 12 and 17, not labeled; Figure 2) of the deposition chamber (16; Figure 1; column 3, lines 30-56) - claim 2
- ii. The deposition system (column 2; lines 10-15) of claim 1, wherein the cleaning gas (column 4, lines 18-31) source is configured to generate reactive fluorine species - claim 3
- iii. The deposition system (column 2; lines 10-15) of claim 1, wherein the cleaning gas (column 4, lines 18-31) source is configured to generate a reactive cleaning gas (column 4, lines 18-31) for cleaning by products of WSi_x film generation - claim 4. Applicant's claim requirements of "for cleaning by products of WSi_x film generation" is a recitation of intended use of the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).
- iv. The deposition system (column 2; lines 10-15) of claim 1, wherein the plurality of cleaning gas injection ports (44a,b; Figure 4; column 7, lines 18-31) include a first subset of the plurality of cleaning gas injection ports (44a,b; Figure 4; column 7, lines 18-31) disposed at a first angle (column 7, lines 48-56) relative to side walls (70; Figure 4) of the

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deposition chamber (16; Figure 1; column 3, lines 30-56), and a second subset of the plurality of cleaning gas injection ports (44a,b; Figure 4; column 7, lines 18-31) disposed at a second angle (column 7, lines 48-56) relative to the side walls (70; Figure 4) - claim 5

- v. The deposition system (column 2; lines 10-15) of claim 1, wherein the plurality of cleaning gas injection ports (44a,b; Figure 4; column 7, lines 18-31) are distributed along an interior rim (40; Figure 4) of a lid (piece between 12 and 17, not labeled; Figure 2) of the deposition chamber (16; Figure 1; column 3, lines 30-56) - claim 6
- vi. The deposition system (column 2; lines 10-15) of claim 1, further including internal plumbing (46,48; Figure 4; column 7, lines 18-31) configured to transport the reactive cleaning gas (column 4, lines 18-31) to the cleaning gas (column 4, lines 18-31) distribution channel (54, 56; Figure 4; column 7, lines 18-31), the internal plumbing (46,48; Figure 4; column 7, lines 18-31) being disposed within a wall of the deposition chamber (16; Figure 1; column 3, lines 30-56) - claim 7
- vii. The deposition system (column 2; lines 10-15) of claim 1, further including a plurality of channel openings (baffle plate 62; Figure 4; column 7, lines 18-31) configured for reactive cleaning gas (column 4, lines 18-31) to enter the cleaning gas (column 4, lines 18-31) distribution channel (54, 56; Figure 4; column 7, lines 18-31) - claim 8
- viii. The deposition system (column 2; lines 10-15) of claim 1, further including a chamber collar (40; Figure 4) configured to separate a lid (piece between 12 and 17, not labeled; Figure 2) of the deposition chamber (16; Figure 1; column 3, lines 30-56) from walls (70; Figure 4) of the deposition chamber (16; Figure 1; column 3, lines 30-56), the chamber

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- collar (40; Figure 4) including internal plumbing (46,48; Figure 4; column 7, lines 18-31) configured to supply reactive cleaning gas (column 4, lines 18-31) to the cleaning gas (column 4, lines 18-31) distribution channel (54, 56; Figure 4; column 7, lines 18-31) – claim 9
- ix. The deposition system (column 2; lines 10-15) of claim 1, wherein the plurality of cleaning gas injection ports (44a,b; Figure 4; column 7, lines 18-31) are configured to deliver a greater concentration of reactive cleaning gases (column 4, lines 18-31) to a cooler region of a deposition chamber (16; Figure 1; column 3, lines 30-56) than to a warmer region of the deposition chamber (16; Figure 1; column 3, lines 30-56) – claim 10. Applicant's claim limitation is a recitation of intended use of the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).
- x. A deposition chamber (16; Figure 1; column 3, lines 30-56) lid (piece between 12 and 17, not labeled; Figure 2) comprising: a cleaning gas (column 4, lines 18-31) distribution channel (54, 56; Figure 4; column 7, lines 18-31) disposed within a perimeter of the deposition chamber (16; Figure 1; column 3, lines 30-56) lid (piece between 12 and 17,

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not labeled; Figure 2) and configured to circulate a reactive cleaning gas (column 4, lines 18-31); a plurality of cleaning gas injection ports (44a,b; Figure 4; column 7, lines 18-31) configured to deliver the reactive cleaning gas (column 4, lines 18-31) from the cleaning gas (column 4, lines 18-31) distribution channel (54, 56; Figure 4; column 7, lines 18-31) to an interior of a deposition chamber (16; Figure 1; column 3, lines 30-56), the cleaning gas injection ports (44a,b; Figure 4; column 7, lines 18-31) distributed around the deposition chamber (16; Figure 1; column 3, lines 30-56) lid (piece between 12 and 17, not labeled; Figure 2) and configured to deliver a greater concentration of the reactive cleaning gas (column 4, lines 18-31) to an upper region of the deposition chamber (16; Figure 1; column 3, lines 30-56) than to a lower region of the deposition chamber (16; Figure 1; column 3, lines 30-56); and internal plumbing (46,48; Figure 4; column 7, lines 18-31) configured to supply the reactive cleaning gas (column 4, lines 18-31) to the cleaning gas (column 4, lines 18-31) distribution channel (54, 56; Figure 4; column 7, lines 18-31) – claim 11. Applicant's claim requirement of "and configured to deliver a greater concentration of the reactive cleaning gas to an upper region of the deposition chamber than to a lower region of the deposition chamber" is a claim requirement of intended use of the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of

performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

- xi. The deposition chamber (16; Figure 1; column 3, lines 30-56) lid (piece between 12 and 17, not labeled; Figure 2) of claim 11, further including a lid (piece between 12 and 17, not labeled; Figure 2) section configured to support a processing gas shower (15; Figure 1; column 3, lines 30-56), the processing gas shower (15; Figure 1; column 3, lines 30-56) being separate from the cleaning gas (column 4, lines 18-31) distribution channel (54, 56; Figure 4; column 7, lines 18-31) – claim 12
- xii. The deposition chamber (16; Figure 1; column 3, lines 30-56) lid (piece between 12 and 17, not labeled; Figure 2) of claim 11, further including a processing gas shower (15; Figure 1; column 3, lines 30-56) separate from the internal plumbing (46,48; Figure 4; column 7, lines 18-31) – claim 13
- xiii. The deposition chamber (16; Figure 1; column 3, lines 30-56) lid (piece between 12 and 17, not labeled; Figure 2) of claim 11, wherein the plurality of cleaning gas injection ports (44a,b; Figure 4; column 7, lines 18-31) include a first subset of the plurality of cleaning gas injection ports (44a,b; Figure 4; column 7, lines 18-31) disposed at a first angle (column 7, lines 48-56) relative to an edge of the deposition chamber (16; Figure 1; column 3, lines 30-56) lid (piece between 12 and 17, not labeled; Figure 2), and a second subset of the plurality of cleaning gas injection ports (44a,b; Figure 4; column 7, lines 18-31) disposed at a second angle (column 7, lines 48-56) relative to the edge – claim 14
- xiv. The deposition chamber (16; Figure 1; column 3, lines 30-56) lid (piece between 12 and 17, not labeled; Figure 2) of claim 11, wherein the plurality of cleaning gas injection

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ports (44a,b; Figure 4; column 7, lines 18-31) are configured to deliver a greater concentration of reactive cleaning gases (column 4, lines 18-31) to a cooler region of a deposition chamber (16; Figure 1; column 3, lines 30-56) than to a warmer region of the deposition chamber (16; Figure 1; column 3, lines 30-56) – claim 16. Applicant's claim limitation is a recitation of intended use of the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

- xv. A deposition system (column 2; lines 10-15) comprising: equivalent means for (see above) transporting a reactive cleaning gas (column 4, lines 18-31) to a cleaning gas (column 4, lines 18-31) distribution channel (54, 56; Figure 4; column 7, lines 18-31) disposed in a lid (piece between 12 and 17, not labeled; Figure 2) of the deposition chamber (16; Figure 1; column 3, lines 30-56); equivalent means for (see above) circulating the reactive cleaning gas (column 4, lines 18-31) around a perimeter of the lid (piece between 12 and 17, not labeled; Figure 2); equivalent means for (see above) passing the reactive cleaning gas (column 4, lines 18-31) into the interior of the deposition chamber (16; Figure 1; column 3, lines 30-56); and equivalent means for (see above) generating a desired concentration gradient of the reactive cleaning gas (column

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4, lines 18-31) in the deposition chamber (16; Figure 1; column 3, lines 30-56), the desired concentration gradient including a greater concentration near cooler elements within the deposition chamber (16; Figure 1; column 3, lines 30-56) than near warmer elements – claim 21

van Os does not teach a “cleaning gas (column 4, lines 18-31) source”. Van Os further does not teach:

- i. The deposition chamber (16; Figure 1; column 3, lines 30-56) lid (piece between 12 and 17, not labeled; Figure 2) of claim 11, wherein the cleaning gas (column 4, lines 18-31) distribution channel (54, 56; Figure 4; column 7, lines 18-31) has a cross-section ten or more times greater than a cross-section of one of the plurality of cleaning gas injection ports (44a,b; Figure 4; column 7, lines 18-31) – claim 15

Murugesh teaches a deposition system (Figure 3) including a “cleaning gas source” (125, Figure 3).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Murugesh’s cleaning gas source and to optimize the relative dimension of van Os’s cleaning gas distribution channel (54, 56; Figure 4; column 7, lines 18-31) relative to van Os’s cleaning gas injection ports (44a,b; Figure 4; column 7, lines 18-31).


Motivation to add Murugesh’s cleaning gas source and to optimize the relative dimension of van Os’s cleaning gas distribution channel (54, 56; Figure 4; column 7, lines 18-31) relative to van Os’s cleaning gas injection ports (44a,b; Figure 4; column 7, lines 18-31) is to maintain the process cleaning gas within confines for delivery and to optimize the cleaning gas flow during process cleaning, respectively. It is well established that changes in apparatus dimensions are

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within the level of ordinary skill in the art.(Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.


7/20/15